THE AMERICAN
JOURNAL OF PHARMACY.

DECEMBER, 1894.

ON SOME OF THE TESTS FOR QUININE.

By Theodore G. Wormley, M.D.

The recognition of quinine by chemical tests, when present in notable quantity, is usually a matter of great ease. Under certain conditions, however, as in its extraction from complex organic mixtures or from the tissues, it may be recovered only in minute quantity, and its presence may then not be so readily determined, at least by purely chemical tests. Among the strictly chemical tests for this substance, the *thalleioquin* reaction as it is termed, is one of the most characteristic, and at the same time one of the most delicate. This test, however, requires caution in its application, since it may give a negative result even in the presence of quinine in considerable quantity.

I. THALLEIOQUIN TEST.

This test was first proposed by Prof. M. Andre, of Mentz, in 1835,[1] and consists in the production of a bright emerald green coloration when a solution of a salt of quinine is treated with chlorine water, followed by the addition of a little aqua ammonia. M. Andre observed that this order of the application of the reagents was necessary for the production of the green color.

R. Brands, in 1839,[2] more fully examined this reaction and found that the production of the green color was dependent upon the presence of the substances employed in certain proportions, otherwise it did not appear. He found that the chlorine caused a

[1] See this Journal, viii, 208.
[2] See *Ibid.*, xi, 36.

decomposition of the quinine which varied with the amount of chlorine employed, and thus determined whether a green precipitate would be produced, or the liquid simply acquire a green color or become yellow.

The green precipitate thus produced was found to have a bitter taste similar to that of quinine; was insoluble in cold water and only sparingly soluble in boiling water; insoluble in ether, but readily soluble in alcohol, and readily soluble in diluted acids forming red solutions, from which it was reprecipitated of a green color on neutralizing the solution with ammonia.

In 1853, A. Vogel[1] proposed to modify this test by treating the quinine solution after addition of chlorine water, with a solution of potassium ferrocyanide and then adding a few drops of ammonia, when the mixture would assume a deep *red* color, the green color not appearing.

Professor Flückiger, in 1861, confirmed the observation of Vogel and found that the same red coloration might be produced by substituting potassium ferricyanide for the ferrocyanide.

More recently, Chas. F. Zeller[2] has examined this test in regard to the production of a green coloration under the action of chlorine and ammonia, and confirmed the observations of Brands, namely: that the results were influenced by the relative proportion of the substances employed.

It being thus shown that this test was much influenced by the relative proportions of quinine and chlorine present, the following investigations were made for the purpose of more definitely determining the range within which the green coloration would manifest itself in different quantities of the same solution, and in solutions of different degrees of dilution.

The quinine was employed in solution both as sulphate and hydrochloride, the 1-100th solutions being prepared by dissolving, by the aid of just sufficient of the diluted acid to effect solution, 1 gramme of the pure alkaloid in 100 c.c. of water. The more dilute solutions were prepared from the 1-100th solutions, by the required dilution with water.

The chlorine water consisted of a saturated aqueous solution of

---

[1] This JOURNAL, 1853, 516.

[2] See *Ibid.*, 1880, 385.

the washed gas. This solution, for uniformity of results, should be freshly prepared and preserved from the action of light. When this reagent was used in the form of drops, these were delivered from a pipette delivering on an average twenty-five drops per cubic centimetre. The ammonia employed had a density of 950.

A. 1-100th solution of quinine.

1. 5 c.c. of this solution (= 50 mgms. quinine) yields with:

(*a*) 0·1 c.c. of chlorine water: a colorless solution which, on the addition of a drop of ammonia, yields a copious white precipitate (of quinine), and after a little time, the mixture acquires a rose-red color; on the addition of a second drop of ammonia, the mixture becomes colorless, then slowly assumes a greenish hue which becomes well marked.

(*b*) 0·5 c.c. of chlorine water, followed by a drop of ammonia, yields a copious white precipitate, and the mixture quickly assumes a green color, then becomes dark rose-red and finally green.

(*c*) 1·0 c.c. chlorine water and a drop of ammonia: an immediate green color, which quickly changes to dark red, then to purple or blue.

2. 1 c.c. of a 1-100th solution (= 10 mgms. quinine) yields with:

(*a*) One drop chlorine water and then a drop of ammonia: a copious white precipitate, which quickly assumes a green color.

(*b*) 0·5 c.c. chlorine water and a drop of ammonia: an intense green coloration.

(*c*) 1·0 c.c. chlorine water and one drop of ammonia: a bright green coloration, which becomes darker in color and finally nearly black.

3. 0·1 c.c. of a 1-100th solution (= 1 mgm. quinine) in a very small, narrow test tube, yields with:

(*a*) One drop of chlorine water and a drop of ammonia: a copious green precipitate.

(*b*) Two drops chlorine water and a drop of ammonia: a bright green coloration.

(*c*) Three drops chlorine water and a drop of ammonia: no precipitate, but the mixture immediately acquires a bright green color, which quickly darkens.

B. 1-1000th solution of quinine.

1. 5 c.c. of the solution (= 5 mgms. quinine) yields with:

(*a*) One drop chlorine water and a drop of ammonia: a white precipitate (quinine) which quickly assumes a greenish hue, slowly changing to well-marked bluish green.

(*b*) 0·1 c.c. chlorine water and one drop of ammonia: the precipitate quickly acquires a strong, bluish-green color.

(*c*) 0·5 c.c. chlorine water and a drop of ammonia: an intense, emerald-green coloration.

(*d*) 1 0 c.c. chlorine water and one drop of ammonia, no precipitate, but a strong yellow coloration, which soon changes to deep purple.

(*e*) 2·0 c.c. chlorine water and a drop of ammonia, a colorless mixture; on further addition of ammonia, a dirty-brown coloration may be produced.

2. 1 c.c. of a 1–1000th quinine solution, yields with one drop of ammonia, after addition of:

(*a*) One drop chlorine water: a green turbid mixture.

(*b*) 0·1 c c. chlorine water: a bright green coloration.

(*c*) 0·5 c.c. of the chlorine reagent: a pale green coloration.

(*d*) 1·0 c.c. chlorine water: a slightly yellow mixture.

3. 0·1 c.c. of a 1–1000th solution, under like conditions, yields with:

(*a*) One drop chlorine water: a very bright green coloration.

(*b*) Two drops of the chlorine reagent: a less intense green coloration.

C. 1–5000th solution of quinine.

1. 5 c c. of the solution = (1 mg. quinine) yields with a drop of ammonia, after addition of:

(*a*) One drop chlorine water: a colorless solution, which, after a time, may acquire a greenish hue.

(*b*) 0·2 c.c. chlorine water: a fine, emerald green solution.

(*c*) 0 5 c.c chlorine water: a well-marked green coloration, quickly discharged on shaking the mixture.

(*d*) 1·0 c.c. of chlorine reagent: no coloration, but, after a time, the mixture assumes a yellow hue.

2. 1 c.c. of a 1–5000th solution, with one drop of ammonia after adding:

(*a*) One drop chlorine water: a fine, green coloration, changing to bluish-green.

(*b*) 0·1 c.c. chlorine water: a pale green coloration.

(*c*) 0·5 c.c chlorine reagent: a light green color, quickly changing to a faintly yellow.

3. 0·1 c c. of 1–5000th solution, with one drop ammonia, after adding:

(*a*) One drop chlorine water: a well-marked green coloration.

(*b*) Two drops chlorine water: only a faintly yellowish color.

D. 1–10000th solution of quinine.

1. 5 c.c. of the solution (= 0·5 mg. quinine) yields with one drop of ammonia, after addition of:

(*a*) One drop chlorine water: the mixture slowly acquires a greenish hue.

(*b*) Two drops chlorine water: a strongly marked green coloration.

(*c*) 0·2 c.c. of chlorine water: a colorless mixture.

2. 1 c.c. of a 1–10,000th solution, yields with:

(*a*) One drop chlorine water and one drop ammonia: a marked green coloration.

(*b*) Two drops chlorine water and a drop of ammonia: the mixture may present a greenish hue, which quickly changes to yellow.

From 0·1 c.c. of a 1–10000th quinine solution, a greenish coloration may be obtained by employing a drop of a much-diluted solution of chlorine.

From 5 c.c. of a 1–20000th solution of quinine, no green coloration was obtained, even on employing a diluted solution of chlorine.

In 1872, Prof. Flückiger[1] proposed to substitute *bromine* for chlorine in this test, and stated that its reaction was much more

[1] Neues *Jahr. f. Pharm.*, 1872. 139.

delicate than that of chlorine, since under it a green coloration might be obtained from a 1–20000th solution of quinine, whereas, chlorine had its limit in about a 1–5000th solution.

In the following examinations a saturated aqueous solution of bromine was employed, it being prepared by agitating excess of bromine with water, and, after subsidence, decanting the clear, highly colored solution. The reagent should be freshly prepared, since it may, within twenty-four hours, especially if exposed to light, undergo a marked change. A saturated aqueous solution of the reagent contains practically 1 per cent. by volume, or 3 per cent. by weight of bromine.

A. 1–100th solution of quinine.

1. 5 c.c. of the solution yields with:

(*a*) One drop of bromine water: a copious yellow precipitate which quickly dissolves to a colorless solution, the addition of a drop of ammonia causes a white precipitate (quinine), which, after a time, acquires a bluish hue, then a bluish green color.

(*b*) Three drops bromine water then one drop ammonia, yield a precipitate which soon assumes a greenish blue color.

(*c*) 0·5 c.c. bromine water followed by one drop ammonia: the mixture quickly becomes bluish green, which increases its intensity.

(*d*) 1·0 c.c. bromine water causes a slightly yellow coloration; the addition of 0·1 c.c. ammonia produces a white precipitate which quickly assumes a bright green color, which may change to purple.

The exact coloration produced in the above solutions depends somewhat upon the manner in which the reagents mix with the quinine solution. The best results are obtained by dropping the reagents into the quinine solution without agitation.

2. 1 c.c. of the quinine solution yields with one drop of ammonia after addition of:

(*a*) One drop bromine water: a white precipitate which soon assumes a green color.

(*b*) 0·2 c.c. bromine water: quickly a bright green solution.

(*c*) 0·5 c.c. bromine water: a purple precipitate, which, after a time, assumes a strong green color.

3. 0·1 c.c. of a 1–100th quinine solution, yields with one drop of bromine water and a drop of ammonia, a white precipitate which quickly assumes a green color.

B. 1–1000th solution of quinine.

1. 5 c.c. of the solution yields with one drop of ammonia, after adding:

(*a*) One drop bromine water: a white precipitate which soon assumes a bluish-green color.

(*b*) 0·1 c.c. bromine: an immediate bright green coloration.

(*c*) 0·3 c.c. bromine water alone causes a yellow coloration, which on addition of the ammonia, is changed to deep purple, and this may slowly change to very dark green.

2. 1 c.c. of the quinine solution with one drop of the bromine water and one drop of ammonia will yield a bright green coloration. Under the action of a slightly larger quantity of the bromine reagent, only a purple color will appear, or the mixture will remain colorless.

3. 0·1 c.c. of the quinine solution with a *minute* drop of the bromine water and one drop of ammonia, will yield a green coloration; but if a full drop of the bromine reagent be employed, a colorless mixture will result. With a diluted solution of the bromine water (1:4), a fine green coloration may be obtained.

C. 1–5000th solution of quinine.

1. 5 c.c. of the solution with one or two drops of the bromine water and one drop ammonia, yields a good green coloration. With a slightly larger amount of the bromine reagent, the mixture remains colorless.

2. 1 c.c. of the quinine solution with one drop of bromine water and one drop ammonia, will after a time acquire a green coloration. If two drops of the bromine water be employed, the mixture remains permanently colorless.

3. 0·1 c.c. yields with a drop of the bromine reagent, a deep yellow color, which is quickly discharged to a permanently colorless solution by a drop of ammonia. Under the action of a drop of diluted bromine water (1:9), a bright green coloration may be obtained.

D. 1–10000th solution of quinine.

1. 5 c.c. of the solution with:

(*a*) One drop bromine water yields a colorless solution, which on addition of a drop of ammonia quickly assumes a green color; this becomes deep bright green, which remains unchanged for many hours.

(*b*) Two drops of bromine water causes a yellow color, which is immediately discharged by a drop of ammonia, and the mixture remains colorless.

2. 1 c.c. of the quinine solution fails to yield a green coloration unless the bromine reagent be diluted.

3. From 0·1 c.c. of the quinine solution, no green coloration was obtained, even with the diluted bromine reagent.

E. 1–20000th quinine solution.

5 c.c. of this solution yields no green coloration with the undiluted bromine reagent; but under a dilution of 1:2 a well-marked green color may be obtained.

From the foregoing it is obvious that the production of a green color under the action of this test depends upon the presence of the quinine and bromine in proportion contained within rather narrow limits; otherwise the green coloration will not manifest itself. Should it be desired to apply this test to only a small and limited quantity of a suspected solution, it would be necessary, or at least advisable, to first ascertain under what conditions a similar volume of solution of quinine of known strength would give a positive reaction with a given quantity of the bromine reagent, after proper dilution of the latter if necessary.

If an aqueous solution of chlorine, instead of bromine, be employed in the thalleioquin test, a positive reaction will manifest itself through a greater range than when bromine is employed, the result being less readily affected by excess or deficiency of the reagent.

In regard to the production of a *red* coloration, by treating the quinine solution, after addition of bromine or chlorine, and before adding the ammonia, with *potassium ferrocyanide* solution, as advised by Vogel, the results were less satisfactory than the test without the use of the potassium salt. With solutions containing more than 1-10000th of the alkaloid, a green or red or other coloration may be

developed, the result depending upon the relative proportions of the reagents employed.

On treating 5 c.c. of a 1-1000th quinine solution with one drop of bromine water followed by one drop of potassium ferrocyanide solution (1:12) and a drop of ammonia, the result is about the same as without the presence of the potassium salt; that is, a white precipitate soon becoming green is produced. But, if under these conditions 0·2 c.c. of the potassium solution be employed, a portion of the mixture may be red and a portion green in color.

5 c.c. of a 1-5000th solution of the alkaloid under the action of one drop each of the reagents as above, yields a fine green coloration. If, however, to this quantity of the quinine solution one drop of bromine water be added and then 0·5 c.c. of the ferrocyanide solution, the mixture, without the addition of ammonia, immediately assumes a deep red color. If a drop of ammonia be now added, the red color quickly changes to a beautiful purple.

5 c.c. of a 1-10000th quinine solution with one drop each of the reagents, yields a fine red-purple coloration which soon changes to green.

5 c.c. of a 1-20000th solution, under like conditions, yields a fine red coloration, which quickly fades to a light yellow color.

2. HERAPATHITE TEST

This test was first proposed by Dr. Herapath, in 1852, and consists in the formation of *quinine iodosulphate* or *Herapathite*, as it has been termed. This compound may be obtained by treating a solution of quinine in a mixture of strong acetic acid and alcohol, with an alcoholic solution of iodine. In a little time the iodosulphate separates out in the form of characteristic plates and rosette groups of crystals. By reflected light, the crystals are of a dark green color; under transmitted light they are dichroic and strongly polarize light.

The reagents may be prepared as follows: (*a*) Thirty volumes of strong acetic acid are mixed with ten volumes of strong alcohol and one volume of diluted sulphuric acid (1:10). (*b*) One part of iodine is dissolved in about twenty parts by weight of alcohol.

To apply the test, a drop of the quinine solution is evaporated to dryness, and the residue treated with a drop of the first-mentioned solution; a minute drop, or sufficient to color the liquid brownish-

yellow, of the alcoholic solution of iodine is then added. Very soon portions of the mixture will present a dark green deposit, which when examined by a moderate power (75 diam.) of the microscope will be found to consist of the crystals in question. The formation of these crystals is perfectly characteristic of quinine.

The residue from *one drop* of a 1-100th solution of quinine, in the form of sulphate, when treated with a drop of the acetic acid mixture and then sufficient of the iodine solution to impart a strong color, will yield innumerable crystals of the iodosulphate compound.

A 1-500th solution residue will generally yield an abundant deposit of the crystals.

The residue from a drop of a 1-1000th solution, if simply moistened with the acetic acid liquid and then with a minute drop of the iodine solution, may yield satisfactory results; but it requires a nice adjustment of the reagents to obtain satisfactory results from this quantity of the alkaloid.

3. FLUORESCENCE.

One of the most striking properties and at the same time the most delicate reaction of quinine at present known, is the fluorescence of solutions of its oxysalts, especially the sulphate. Normal solutions of the hydrochloride, hydrobromide, hydriodide and hydrocyanide present little or no fluorescence. A solution of the hydrochloride containing a limited excess of hydrochloric acid, may, as pointed out by Prof. R. A. Witthaus,[1] present, a well marked or even strong fluorescence, especially in dilute solutions; but this is permanently destroyed by a slightly larger quantity of the free acid.

When in solution as quinine normal acid sulphate, without excess of acid, and examined by ordinary reflected light in volumes of 50 to 100 c.c. the blue fluorescence is very intense in the 1-100th, 1-1000th, and 1-10000th solutions, and very well marked in a 1-50000th solution; but it is not apparent in a 1-100000th solution, and is only faintly marked even under a cone of condensed sunlight.

If 1 c.c. of the acid sulphate solution, placed in a small test tube, be examined it will present as follows:

(1) 1-100th solution, a very strong blue fluorescence in reflected light, which becomes intense in condensed sunlight.

[1] Researches Loomis Laboratory, 1892, 91.

(2) 1-1000th solution, a strongly marked fluorescence in reflected light; only feebly marked in direct sunlight; but intense in a cone of sunlight.

(3) 1-10000th solution, a just perceptible fluorescence in reflected light; appears colorless in sunlight; intensely fluorescent in a cone of sunlight.

(4) 1-50000th solution exhibits no marked fluorescence in either reflected or in direct sunlight, and only a faint fluorescence under a cone of sunlight. On the addition of a drop of dilute sulphuric acid, the solution presents a quite well-marked fluorescence in condensed sunlight.

(5) 1-100000th solution in condensed sunlight presents only a faint fluorescence; but on addition of a drop dilute sulphuric acid, the fluorescence is well marked.

The last-mentioned degree of dilution is by no means the limit of the fluorescence of quinine solutions, under certain conditions. Kerne, rby a specially constructed instrument, termed by him the fluorescope, was able to obtain the fluorescence beautifully marked in a solution of the alkaloid under a dilution of two million times.

It should be borne in mind that the fluorescence of quinine solutions, even of the sulphate, may be entirely prevented by the presence of chlorides, bromides and iodides, and the free acids of these salts. If to 1 c.c. of a 1-100th solution of quinine sulphate, which is strongly fluorescent, one drop of hydrochloric acid or of a solution of sodium chloride (1 : 10), be added, the fluorescence is immediately and wholly destroyed, and is not reproduced on the addition of even 0·5 c.c. of dilute sulphuric acid. The interference of bromine and iodine is as prompt and complete as that of chlorine.

According to the recent observations of MM. Sestini and Campani[1] the fluorescence of sulphuric acid solutions of quinine, especially when dilute, may also be concealed by the presence of *phenacetine*. According to these observers, this substance may also greatly interfere with the normal reaction of quinine with both chlorine and bromine in the thalleioquin test.

The property of fluorescence is possessed, although in a less degree, by some of the other cinchona alkaloids; and Dr. Bence Jones, of London, has described a substance normally present in the body, which has a similar property, and named by him *animal quinoidine*.

[1] Jour. Chem. Soc., Abs., May 1892, 665.

Beside these substances, certain vegetable principles and extracts and the hydrocarbon oils present fluorescent properties.

4. TEST OF TASTE.

The intensely bitter taste of quinine and its salts may serve as a test of its presence. Of the ordinary preparations of quinine, the tannate is the least and the free alkaloid next least bitter; the normal sulphate is less bitter than the bisulphate, hydrobromide or hydrochloride.[1]

The taste of the acid sulphate is very distinct and strongly marked in a single drop of a 1–10000th solution; and is still distinct in the same quantity of a 1–20000th solution; but, according to several persons, is not perceived in a drop of a 1–50000th solution.

In the very elaborate investigations of Dr. G. Kerner[2] on the absorption and elimination of quinine, he found that when taken into the stomach in 0·5 gram (7·5 grains) doses, it appeared in the urine in fifteen minutes thereafter; and that one-half of the total quantity taken was thus eliminated in six hours; and one-fourth in the following six hours; but that a trace might still be present in the urine at the end of seventy-eight hours.

Of the quinine thus eliminated Dr. Kerner found that a large portion had undergone a material change, in that while it still possessed fluorescent properties, responded to the reaction with chlorine and ammonia, and with chlorine and potassium ferrocyanide, it no longer had a bitter taste, it now being tasteless. By experiments he found that under the limited oxydation of quinine by potassium permanganate, a substance was produced which was tasteless and corresponded in every respect to this eliminated quinine. On analysis this oxydation product was found to be *dihydroxyl quinine*, having the composition $C_{20}H_{24}N_2O_2$, 2OH. From these results Dr. Kerner concluded that it was under this form that the alkaloid, in part at least, appeared in its tasteless condition in the urine.

If then, in the absorption of quinine or under oxydation, this change to the tasteless variety may take place, it is easy to understand that in the extraction of the alkaloid from the urine or the tissues, this important corroborative test might fail, even when the chemical tests indicated its presence. At present we have little or

[1] Prescott Organic Analysis, p. 127.

[2] Archiv für Physiologie, ii, 1869, pp. 200–243; iii, 1870, 93–165.

no experience in regard to the recovery of quinine from the body, long periods after death.

That the alkaloids in general may undergo a slow and gradual change in the presence of decomposing animal matter seems to be fully established by the investigations of Profs. Buchner, Gorup-Besanez and others[1], as well as our own observations, in the case of strychnine, which, under the conditions stated, after a time, loses its property of responding to the color and certain other chemical tests, but still retains its bitter taste and the property of producing tetanic convulsions in frogs.

So also, Dr. Pellacani[2] on mixing a definite quantity of *curarine* with a given quantity of fresh blood and allowing the mixture to putrify under favorable conditions of temperature, found after some months that the alkaloid no longer responded to the physiological test, although it still retained its chemical properties, except with the sulphuric acid test.

From our own experience we are strongly led to believe that when morphine and strychnine are taken in moderate toxic quantity, that portion of the alkaloid which is carried to the tissues by the ordinary process of absorption, entirely loses its property of crystallizing, even when present in quantity sufficient to promptly respond to chemical tests.

When the morphine or strychnine is taken in excessive quantity, a portion seems to be distributed to the organs by simple exosmotic diffusion, and this may readily be recovered in the crystalline state. In a case in which 1·68 grams (about 26 grains) of strychnine were administered subcutaneously to a dog during a period of four hours, in divided doses, so as to keep the animal paralyzed, 56 mgs. of well-crystallized strychnine was recovered from the urine, 26 mgs. from the liver, and 14 mgs. from the blood.

University of Pennsylvania,
Medical Department.

---

[1] *Ann. d' Hyg.*, 1881, 385.
[2] *Rivista Sper. Med. Legal*, xiii, 2, p. 237.

STRUCTURE OF ASARUM CANADENSE, L.

By Edson S. Bastin.

This pretty little plant, commonly called Wild Ginger, is not uncommon in the rich woods of the northern United States. It also occurs as far southward, along the Alleghanies, as South Carolina. It is a modest perennial herb, producing rhizomes which creep extensively near the surface of the ground, and which branch repeatedly, giving rise to new plants. Thus, as in the case of Podophyllum, the plants are commonly found growing in dense patches. The rhizomes are somewhat quadrangular, marked at intervals of about 12 mm, with prominent, more or less oblique scale scars, and producing on their inferior surface, mostly from the nodes, small clusters of slender, nearly simple rootlets averaging 60 mm. in length. The rhizomes possess an aromatic odor, and besides some bitterness, a pungently aromatic taste, reminding one of ginger, hence the popular name of the plant.

The end of the rhizome rises obliquely to form the very short above-ground stem, and this bears two long-petiolate, exstipulate leaves, whose blades are thin, broadly reniform, entire-margined and slightly but distinctly pointed at the apex. They attain a transverse diameter of from 10 to 12 cm., are deep-green and silky-lustrous by reason of a minute pubescence on the upper surface, and are lighter colored and prominently veiny below.

From between the two leaf-bases issues a single pedunculate, nodding, dull-purple flower, which, together with the peduncle, is densely covered on the outside with a woolly pubescence. The calyx is rather fleshy, with its tube adnate to the ovary, and a three-parted limb the segments of which, in the bud, have their tips inflexed, but which, when the flower is in full bloom are wholly recurved.

The corolla in this as in all other species of the Aristolochiaceæ is wanting.

The androecium consists of twelve stamens arranged in two whorls of six each, and the members of the outer are somewhat shorter than those of the inner whorl. The stamens are colored like the calyx and each is provided with a short, thickish, outwardly-curved filament and a two-celled, adnate, longitudinally dehiscent, extrorse anther, whose connective is conspicuously prolonged and pointed.

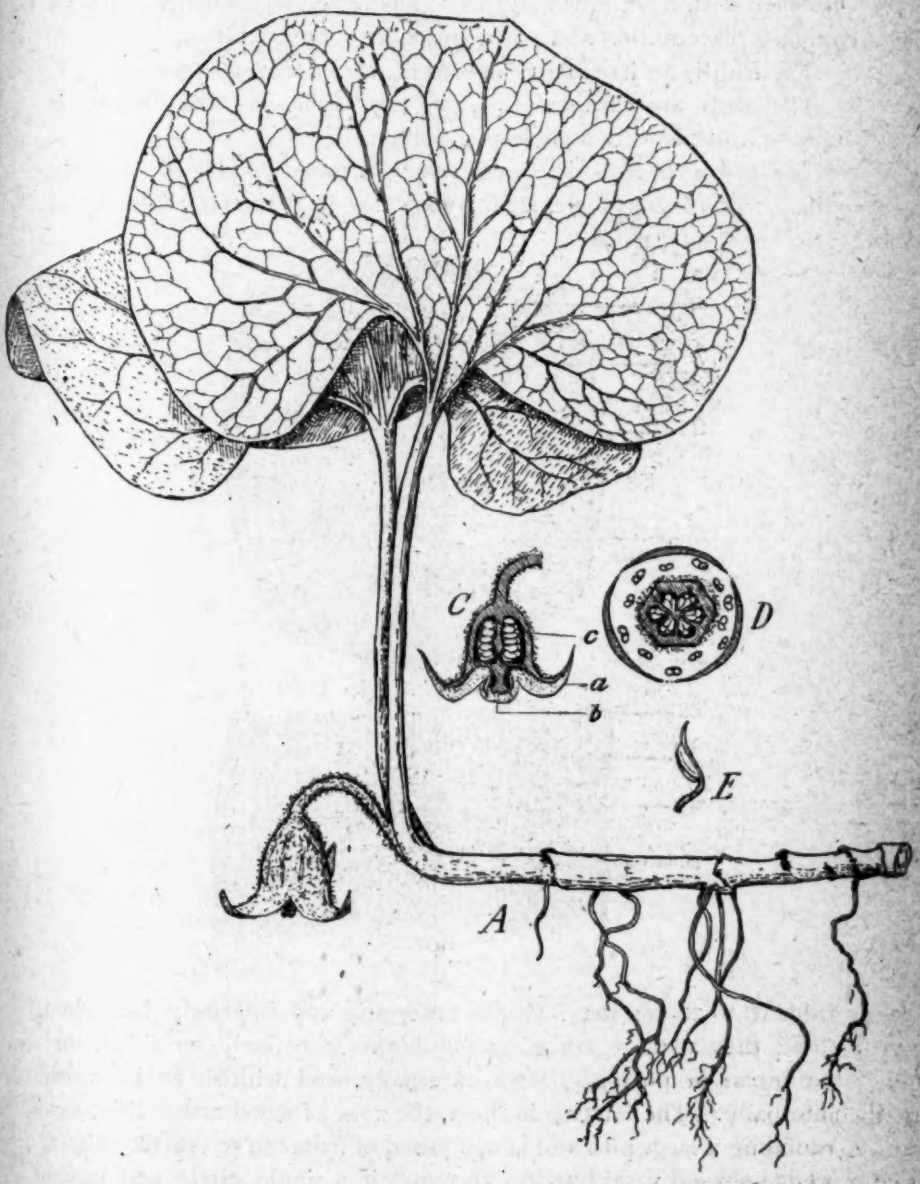


FIG. 1.

The pistil is provided with a short, thick, fleshy style that is crowned with a six-lobed stigma. The ovary is six-celled, with an axillary placentation and numerous anatropous ovules.

The fruit is an irregularly dehiscent, many-seeded capsule.

The seeds are carunculate along the raphe and the embryo is minute, imbedded in a copious albumen.

The rhizomes with the rootlets are the parts employed in medicine. The rhizomes are from 5 to 6 mm. in diameter when fresh,

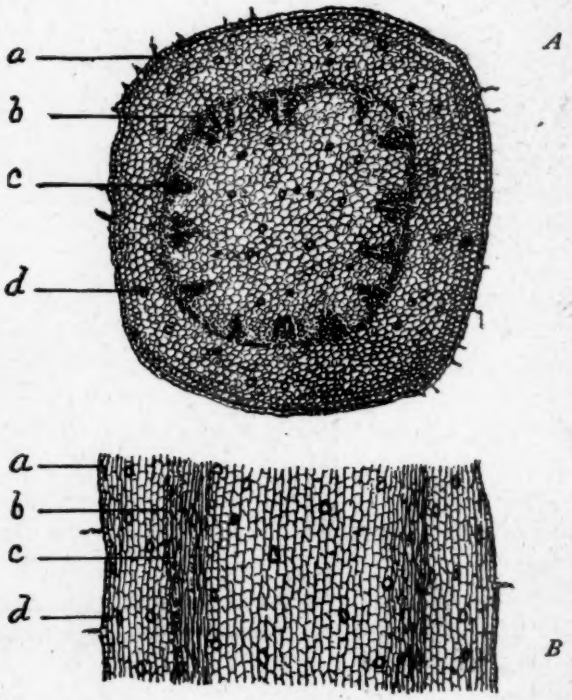


FIG. 2.

from 10 to 20 cm. long, whitish exteriorly and interiorly, but when dried they average considerably thinner, are finely wrinkled, and are brown or purplish-brown externally, and whitish or brownish internally. The fracture is short, the zone of wood rather thin, surrounding a large pith and is composed of from ten to fourteen short, wedge-shaped vasal bundles arranged in a single circle and rather widely separated from each other. The bundles are frequently quite unequal in size and are often set at quite unequal distances in the

circle. The phloem portions of the bundles contain no fibrous elements, and the xylem portions usually no lignified ones except the tracheary tissues, which consist mostly of spiral and scalariform

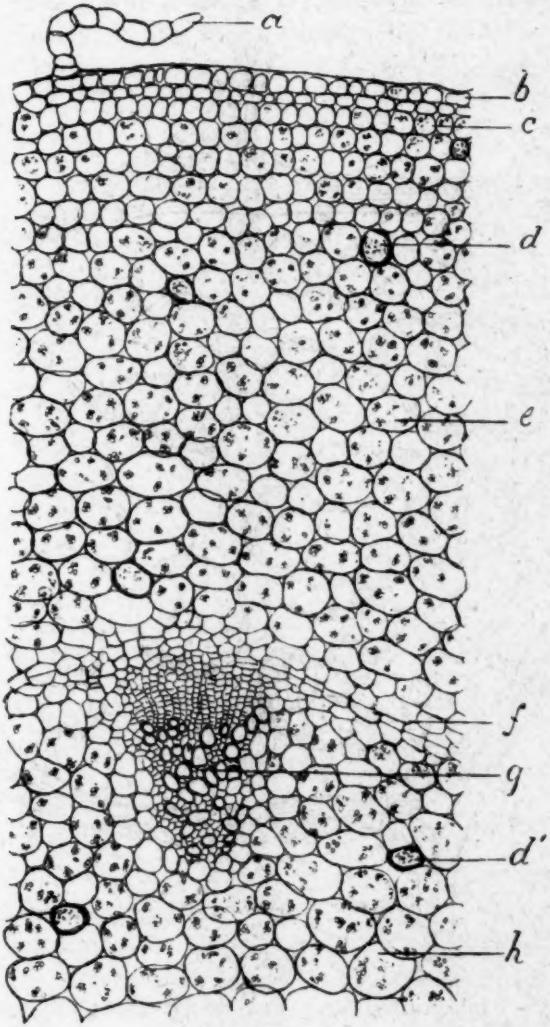


FIG. 3.

ducts and tracheids of small or moderate calibre. The circle of bundles is bounded exteriorly by a zone of parenchymatous cells considerably smaller than those of the cortex exterior to them, con-

stituting a cylinder-sheath, a structure not often seen in the rhizomes of dicotyls.

The epidermis persists even on rhizomes that are quite old, cork not being formed beneath it, as it is in the case of most other rhizomes of dicotyls. Attached to the epidermis are seen scattered,

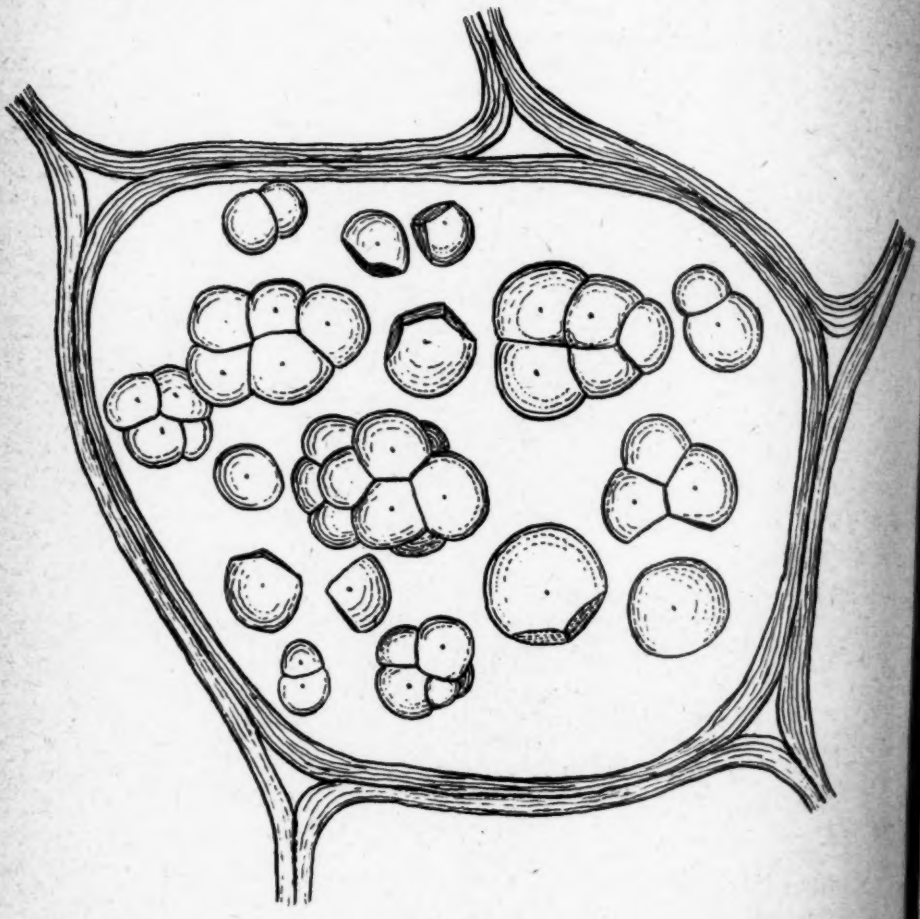


FIG. 4.

simple hairs, each consisting of several elongated cells arranged in linear series. Beneath the epidermis are several layers of collenchyma cells, which in transverse section are usually tangentially elongated. The cells show a tendency to fissure along the thickenings in a tangential direction.

In the thick cortical parenchyma and in the pith occur scattered oil-cells, easily identifiable in the sections after treating them with solution of alcannin. Unless stained, they differ little in appearance from ordinary parenchyma cells, save in the absence of starch.

In the ordinary parenchyma both of the pith and the cortex starch is abundant, though fine-grained. The grains are sometimes simple, but more commonly double, triple, or in masses of from

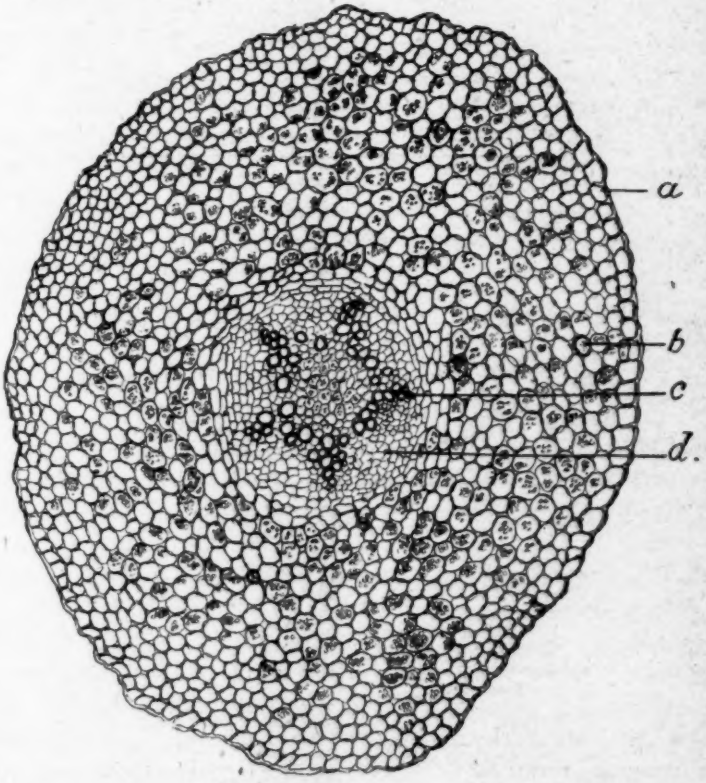


FIG. 5.

three to twelve grains. The hilum, which is sub-central, is inconspicuous and seldom fissured, and the grains show no distinct stratification curves.

The roots, which attain about a millimetre in diameter, have a thick cortical parenchyma, consisting mainly of starch-bearing cells, among which, however, are sprinkled a few oil cells. The central radial bundle, which commonly has a diameter slightly less

than the thickness of the cortex, is usually tetrarch or pentarch, and undergoes few secondary changes. The central part of the bundle usually remains pithy, and its cells contain fine-grained starch.

DESCRIPTION OF FIGURES.

Fig. 1.—*A*, Flowering plant of Asarum Canadense, three-quarters natural size.

C, One of the flowers as seen in vertical section. *a*, segment of calyx; *b*, stigma; *c*, ovules.

D, Ground plan of the flower.

E, One of the stamens.

The above drawings are from the "Laboratory Exercises in Botany."

Fig. 2.—*A*, Transverse section of rhizome magnified nine diameters. *a*, epidermis; *b*, cylinder sheath; *c*, vasal bundle; *d*, secretion cell.

B, Longitudinal section of rhizome, also magnified nine diameters. The small letters refer to the same parts as in *A*.

Fig. 3.—Part of cross-section of rhizome magnified seventy-five diameters. *a*, hair on epidermis; *b*, epidermal cell; *c*, collenchyma; *d*, *d'* secretion cells; *e*, cortical parenchyma cell; *f*, cylinder sheath; *g*, vasal bundle; *h*, pith parenchyma cell.

Fig. 4.—One of the cortical parenchyma cells, containing starch, magnified 1,200 diameters.

Fig. 5.—Transverse section of one of the roots, magnified seventy-five diameters, showing a pentarch bundle in the central cylinder. *a*, epidermis; *b*, secretion cell; *c*, one of the xylem rays; *d*, one of the phloem masses.

RUBUS VILLOSUS.

By Herman Harms, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 137.

For a complete analysis of blackberry bark, the reader is referred to an inaugural essay by G. A. Krauss, in the American Journal of Pharmacy for 1889, page 605; and for further investigation of the glucosidal principle to a paper by the same author, in this Journal, for 1890, page 161.

It was with a view of examining this last substance, as also the tannin of the drug, that the present work was undertaken.

For the former purpose, 1,500 grams of coarsely-powdered bark were exhausted with alcohol, sp. gr., ·820, the percolate concentrated under reduced pressure, diluted with water, and treated with

freshly precipitated ferric hydrate, until no reaction for tannin could be obtained in the filtered liquid. The detannated filtrate so obtained was concentrated under diminished pressure and divided into two portions.

One of these evaporated under the above conditions to dryness, yielded a residue of a reddish-brown color.

This was treated, first with boiling alcohol, sp. gr. ·794, which extracted a brownish-red, bitter substance, and then with ether, sp. gr. ·725, which upon evaporation left a yellow, inodorous, acrid and amorphous body. The last-named product gave at once with sulphuric acid a deep-brown color, which the addition of water changed to greenish and finally to black. The same effect was produced by potassium bichromate and sulphuric acid. No change was caused by nitric acid nor by ferric chloride.

The brownish-red, bitter substance extracted by the boiling alcohol above, was dissolved in acidulated water and the solution so obtained repeatedly shaken with chloroform, which removed a white substance, the following reactions of which gave evidence of the presence of saponin.

With hot sulphuric acid a reddish-brown color was produced.

A solution of the material in water, which readily dissolved it, possessed a marked tendency to froth, and gave an abundant white precipitate with basic lead acetate and with saturated solution of barium hydrate.

A solution of the principle in two per cent. hydrochloric acid when boiled for several hours yielded a blackish precipitate and a reddish-brown liquid, which was filtered and agitated with ether and chloroform in succession.

The residues left upon the evaporation of these solvents, failed to comply with the tests for saponin given above, thus indicating the decomposition of the original substance.

The remaining portion of the detannated and concentrated liquid was shaken with ether, sp. gr. ·725. This solvent left upon evaporation a yellowish-white residue, which, as shown by the following reactions, corresponded in all respects to the *villosin* of Krauss.

Heated on platinum foil, it melted, burned with a yellowish flame and was completely consumed.

It was soluble in methyl and ethyl alcohol, sparingly in water and ether, sp. gr. ·725, and insoluble in chloroform.

It was slowly dissolved by solutions of the alkali hydrates with the production of a yellow color.

An aqueous solution of lead acetate produced no change in a water solution of the substance, but an alcoholic solution of this reagent and also basic lead acetate gave white precipitates with the same liquid.

Sulphuric acid in contact with the residue developed a brownish color, which changed on the addition of one or two drops of water, and the application of gentle heat, into violet and deep blue.

Sulphuric acid and a drop of nitric acid caused an orange-red color, destroyed by heat as well as by the addition of a few drops of water.

The aqueous solution, from which this principle had been removed by means of ether, was evaporated under reduced pressure to dryness. The residue was dissolved in water containing one per cent. of hydrochloric acid, and the solution so obtained boiled for several hours with the production of a reddish-brown precipitate. This was collected, dissolved in alcohol, and the solution, after filtration, allowed to evaporate spontaneously whereby a brownish crystalline mass was procured. To prepare a larger quantity of this product, the experiment was repeated with six kilos of bark which were exhausted with alcohol, sp. gr. ·820.

The percolate was concentrated and detannated as above, then mixed with sufficient hydrochloric acid to produce a solution containing one per cent. of absolute gas. This solution was boiled for several hours, the precipitate formed was collected, and the filtrate after concentration allowed to evaporate spontaneously over sulphuric acid whereby a brownish residue was obtained.

The precipitate produced by the action of hydrochloric acid was treated with alcohol, sp. gr. ·848.

The brownish residue left upon the spontaneous evaporation of that solvent when purified by repeated solution, filtration, and treatment with animal charcoal was finally acquired as a yellowish-brown, indistinctly crystalline mass.

This was treated with ether, which dissolved a portion, and left undissolved a residue that retained the original color. The ethereal solution was set aside to evaporate. The following properties of the insoluble part of the crystalline mass were noted: Insolubility in ether and chloroform; sparing solubility in cold and hot water;

greater solubility in alcohol, sp. gr. ·820, and in hot alkali hydrate solutions, with the development of yellow color. When heated to 265° no signs of melting, but a distinct charring, was noticed. It burned with a bright, yellowish flame and left no residue. Its aqueous and alcoholic solutions were precipitated by both normal and basic lead acetate.

Fehling's solution was slightly reduced, and silver nitrate suffered a slow reduction. With one drop each of sulphuric acid and water, the substance produced a brownish solution, which turned to dark-violet when warmed, and finally to a deep-blue color. Sulphuric and nitric acids gave an orange-red color, which was destroyed by heat and the addition of water.

This substance was evidently the decomposition product of *villosin*, termed by Krauss *villosic acid*.

Upon the evaporation of the ether, with which the crystalline mass was treated, an inodorous, acrid and bitter substance of a yellow color was obtained. An attempt was made to crystallize it from alcohol, sp. gr. ·794, but it separated as an amorphous, resinous body, insoluble in water, sparingly soluble in hot alkaline solutions, but easily soluble in alcohol, ether and chloroform. An alcoholic solution of it, when poured into water, produced a white precipitate. The same solution was not affected by ferric chloride, sodium hydrate nor an alcoholic solution of lead acetate. The substance did not reduce Fehling's solution. Upon the application of heat, it melted, burned and left no ash. A mixture of sulphuric and nitric acids dissolved it without color.

One drop of sulphuric acid and two drops of water produced, when slightly warmed, a purplish color, which changed to brownish-black.

The filtrate from the crude product of the action of boiling hydrochloric acid, as mentioned before, was concentrated and then allowed to evaporate spontaneously over sulphuric acid, whereby a brownish residue was obtained. This was dissolved in boiling alcohol, sp. gr. ·820, treated with animal charcoal and the filtrate after concentration set aside. The amorphous residue that was left upon the vaporization of the solvent was completely soluble in water, and with Fehling's solution gave abundant evidence of the presence of glucose.

The results of the above experiments lead the author to consider the glucosidal principle termed *villosin* as one of the saponins.

TANNIN OF RUBUS VILLOSUS.

Estimation.—That a knowledge might be gained of the relative value of the bark sold in the market and that freshly gathered, the writer made collections of the drug in the vicinity of Philadelphia, on November 24, 1892, January 2, 1893, and February 2, 1893. The three samples which he obtained were numbered, respectively, three, four and five, were taken from medium-sized roots, and were carefully deprived of earth and of the woody portion which is frequently found in commercial bark. Samples one and two were representative of the market article.

The tannin was estimated by the gelatin and alum method.

Somewhat higher results were obtained from samples three and four by the "hide" process.

For comparison, the tannin, moisture and ash of the fresh bark, and also the amount of tannin in the thoroughly dried drug, are given in the subjoined table in percentages:

Sample.	Ash.	Moisture.	Tannin in moist drug.	Tannin in absolutely dry drug.
I	3·68	9·86	13·46	14·93
II	4·53	8·78	10·84	11·89
III	4·56	45·15	10·37	18·91
IV	3·87	38·44	10·72	17·42
V	4·31	9·22	12·74	14·03

Preparation and Purification.—Twelve hundred grams of sample No. II were macerated with water for twenty-four hours, and then percolated with the same solvent until six litres of liquid were obtained.

Several methods for the separation and purification of the tannin of the percolate were then tried.

A portion of the liquid was agitated with acetic ether, but this solvent removed only a small amount of a yellowish substance. The entire percolate was then completely precipitated with lead acetate.

The precipitate was collected on a filter, allowed to drain, and was then decomposed by hydrogen sulphide. The lead sulphide was separated; the liquid boiled to remove hydrogen sulphide, and then filtered.

One-sixth of this filtrate, representing one litre of the original

percolate, was shaken with acetic ether, which, as before, extracted only a very small amount of tannin.

Acetic ether is used for the extraction of most tannins from their aqueous solutions, and on account of the small yield in the above experiment, the watery liquid was tested for tannin with ferric chloride, lead acetate and gelatin, all of which gave abundant precipitates, thus confirming the presence of this principle, and demonstrating the insolubility of the latter in acetic ether, when applied to the aqueous solution.

When this evidence of the inefficacy of acetic ether was established, the whole amount of the tannin-containing liquid was manipulated as follows: The solution was divided into two equal portions, one of these was exactly precipitated with lead acetate, the lead compound collected on a filter, thoroughly drained, then stirred into the retained portion, and the mixture filtered.

The much lighter-colored liquid so obtained was concentrated under reduced pressure to about one-fourth its volume and again filtered. After agitation with successive portions of ether, it was further concentrated, refiltered, and distilled under the above conditions to dryness.

The residue had a brownish-yellow color and was but sparingly soluble in ether, alcohol or acetone. To separate any remaining traces of lead, the residue was treated with distilled water, which readily effected solution of the greater part, the aqueous solution filtered, saturated with hydrogen sulphide, refiltered and distilled to dryness under diminished pressure.

Again, as before, the tannin was obtained as a hard, resinous residue.

As it is customary to recognize the purity of a tannin to a certain extent by obtaining it in a porous or "puffed up" condition, frequent attempts were made to procure this one in that form by dissolving the material in ether, alcohol and acetone alone, and in mixtures of alcohol and acetone, and rapidly distilling off the solvents in a vacuum apparatus; but all efforts to this end were futile.

The substance was then powdered and dissolved in a small quantity of distilled water. This solution was mixed with five times its volume of alcohol, sp. gr. ·794, which produced a copious precipitate of a yellowish mucilage, which was readily soluble in water and precipitable by both neutral and basic lead acetate, but not by gela-

tin and alum. After standing for forty-eight hours, the mucilage was filtered off and the filtrate evaporated under reduced pressure to dryness. Again attempts were made to "puff up" the tannin, but without success.

Obtained by this means, the tannin was of a dark-brownish color, had a faint odor, was readily soluble in water and in alkaline solutions, with the production of a deep reddish-brown color in the latter instance, and was sparingly soluble in ether, sp. gr. ·750 and acetic ether and insoluble in acetone and benzol.

A one per cent. aqueous solution of the tannin reacted as follows:

Boiled with an equal volume of sulphuric acid (1–9), after twenty-four hours standing, a slight brownish precipitate.
Bromine water, yellow precipitate.
Ferric chloride, dark-greenish color;
and
Ammonium hydrate, red-brown color.
Tartar emetic, no change;
and
Ammonium chloride, faint clouding; after twenty-four hours standing, a reddish-brown precipitate.
Copper sulphate, deep-brown precipitate with a greenish-yellow supernatant liquid;
and
Ammonium hydrate, greenish-brown color.
Lead nitrate, brownish-yellow precipitate.
Calcium hydrate, darkening of color; after standing, a dirty yellowish solution with a greenish fluorescence.
Cobalt acetate, grayish-brown precipitate.
Manganese acetate, cloudiness; on standing, a slight reddish precipitate.
Uranium acetate, brownish precipitate.
Ammoniacal picric acid solution, dirty-brownish precipitate; changing, on standing, to a grayish-green.
Potassium bichromate, deep-brown color.
Silver nitrate, reduced.
Ferric acetate, red-brown precipitate.
Gelatin and alum, precipitate.
Fehling's solution, reduced.

Some of the preceding tests resemble those given by the tannin of hemlock, while others, those obtained from cutch tannin, as tabulated in Allen's Commercial Organic Analysis, Volume III, Part 1, pages 102–103.

The ether with which the aqueous solution of the tannin was shaken, previous to its evaporation to dryness, extracted from that

liquid a yellowish crystalline substance which was shown by the following tests to be, most likely, gallic acid:

Potassium cyanide, bright-red color.
Aqueous solution of picric acid followed by ammonia, deep-brownish color.
Ammonio-silver nitrate, immediate reduction.
Lead acetate, yellowish-white precipitate.
Ferric chloride, greenish-black color.
Ferrous sulphate, no change; but on exposure, gradually acquired a bluish color.

Action of Heat.—0·3 gram of tannin was heated with 5 c.c. of glycerin at 160° C., for twenty minutes, and then raised to 200° C., after which it was allowed to cool. The mixture was repeatedly shaken with stronger ether, which, on evaporation, left a yellowish-brown, crystalline residue. An aqueous solution of the latter gave the following reactions:

Calcium hydrate, reddish-brown ppt., soluble in excess of reagent.
Ferric chloride, deepening of color.
Ferric acetate, grayish-brown ppt., with greenish fluorescence.
Fehling's solution, reduced.
Ammoniacal picric acid solution, deepening of color.
Lead nitrate, faint cloudiness.
Lead acetate, faint cloudiness.
Tartar emetic, faint cloudiness.
Ferrous sulphate, no change at first, but solution gradually acquired a bluish color, which was lost upon standing.

With some differences, the above tests correspond to those for pyrogallol.

Action of Acids (*Hydrolysis*).—0·5 gram of the tannin was dissolved in 100 c.c. of two per cent. (absolute gas) hydrochloric acid, and this solution boiled under an upright condenser for three hours. The solution was allowed to stand for twenty-four hours, and then filtered, to remove the blackish precipitate produced by the action of the acid. This substance was insoluble in both cold and hot water, but readily soluble in alcohol, and in alkali hydrate solutions, with a deep-brown color.

The alcoholic solution was not precipitated on pouring it into an excess of water.

The reddish-brown filtrate was shaken with successive portions of ether, sp. gr. ·725, which were mixed and set aside to evaporate. A yellow, crystalline residue, which contained gallic, and probably ellagic acids, was obtained. The aqueous solution was warmed to

expel ether, and then treated with sodium acetate to neutralize the free hydrochloric acid. The liquid now contained free acetic acid, and was precipitated with lead acetate in slight excess. The mixture was filtered, and the filtrate saturated with hydrogen sulphide to remove lead.

After another filtration, the liquid was boiled to expel the excess of the gas, cooled, made alkaline with sodium hydrate, and heated with Fehling's solution for twenty minutes. An abundant precipitate of cuprous oxide was obtained.

Action of Alkali.—0·5 gram of the substance was heated with fused potassium hydrate for ten minutes. A strong, peculiar odor, resembling that of burning bread, was emitted during the fusion.

The fused mass was allowed to cool, then dissolved in water, and after the solution had been first acidified with diluted sulphuric acid, and then carefully neutralized with sodium acid carbonate, it was shaken with ether, sp. gr. ·725, which left, upon evaporation, a residue.

Tests applied to this residue failed to indicate the presence of gallic acid, protocatechuic acid or phloroglucol.

NOTES ON LITHIUM.[1]

By Enno Sander, Ph.D.

For a score of years after its discovery by Arfvedson, lithium received but little attention. Berzelius gave it a bare mention in 1824, and it is merely alluded to by others, who found it in the waters of various springs in Bohemia and elsewhere. In 1841, Lipowitz published a paper in the *Annales de Chimie et de Pharmacie*, in which he reviewed the combinations of lithium with various acids, and dwelt particularly upon its marked affinity for uric acid, with which it forms an acid salt, "the most soluble of all the urates, being soluble in sixty parts of water at 122 degrees F., and not separating therefrom on cooling." Dr. Alexander Ure, in 1843, refers to it as a remarkable solvent of sodium urate, but his use of the substance in practical therapeutics was rendered impossible by its scarcity and high price, and it was not until 1858 that it again attracted any attention in therapeutics. About that year Sir A. B. Garrod writes that he "commenced the administration of lithium

[1] The Journal of the American Medical Association, **23**, 638.

salts as an internal remedy, both in cases of uric acid diathesis connected with gravel, and likewise in chronic gout, and was much gratified at the results." But he subsequently adds, "the great bar to the free use of lithium salts in medicine has been their expense."[1]

The price of the remedy, however, does not seem to have deterred Garrod from its continued use, since we find him, in the treatise referred to, devoting a very considerable space to a review of the important therapeutic results personally obtained by him from the use of the salts of lithium, and their undeniable superiority over any other alkaline salts whatever, for both internal and external exhibition. An indorsement so unqualified, coming from such high authority, as a matter of course, at once attracted the attention of the medical world to the remedy, and gave an immense impetus to experimental investigation with lithium salts in therapeutics. It is seldom, however, that the individuality of an investigator or observer is sufficiently pronounced to carry universal conviction of the truth of his observations or conclusions, especially in researches of this description; and here we find the medical profession at once divided as to the correctness and value of Garrod's conclusions. A controversy was inaugurated, on both sides of which talent and learning were enlisted, and which has brought about a very decided advance in knowledge of the behavior of the alkalies in general, and especially towards uric acid. We need not dwell on the merits of this discussion, but pass to more modern matters.

The behavior of lithium carbonate toward uric acid, and its influence upon the solubility of the urates in the human economy, have, in many instances, without doubt, been greatly exaggerated, a fact due mainly to the lively imagination of owners of certain mineral springs, who herald their waters not merely in the daily press, but in medical and trade journals, through advertisements, in which, to quote Dr. A. C. Peale: "The fact that the water contains lithia, if only a trace, is made prominent by the incorporation of 'lithia' into the name or designation of the spring."

Louis Siebold rose against these unwarrantable exaggerations and usurpations in a paper on "Medical and Chemical Misconceptions about Lithia," read before the British Pharmaceutical Confer-

[1] Treatise on gout and rheumatic gout, by Sir A. B. Garrod; first edition, 1860; third edition, 1877; pp. 368–69.

ence in 1889, the substance of which is that the lithium compounds "owe their place in the materia medica originally to the observation that, as compared with potash or soda, a smaller amount of lithia suffices to form a soluble salt with uric acid, and that this salt is more readily soluble in water than the corresponding potassium and sodium salts. From a chemical point of view, its greater antacid or neutralizing power presents itself as owing to its low atomic weight." "It follows from the atomic weight of lithium and potassium that 74 parts of lithium carbonate possess the same acid-saturating power and are likely to dissolve as much uric acid as 138 parts of potassium carbonate." This saturating power, however, is confined only to the carbonate and indirectly to the citrate (which becomes converted into the carbonate within the organism); but "it is extended to a number of mineral waters containing lithia, generally mere traces of it, notwithstanding the fact that what there is of lithium in these waters generally occurs there as chloride or sulphate, salts which neither directly nor indirectly act as alkalies and possess no solvent action on uric acid."

While such rational arguments are convincing to all reasoning men who, in fact, never entertained a different opinion to that expressed by Siebold, they are eminently dissatisfactory to those who prate of "God-given," "Heaven-endowed" fountains of health, "medicines wrought in the laboratory of Nature," and who are ready to apotheosize lithium and place it in the firmament alongside of Hygeia, or with the benign goddess of Greek mythology who hovered over mineral springs and endowed them with healing virtues. This idea seems still to be a favorite one with some mineral-spring proprietors, whose cards and advertisements display conspicuously the winged female with scanty drapery and small regard for the proprieties.

The occurrence of lithium in natural waters is necessarily limited, not merely on account of the limited amount in which it is found, but more especially on account of its existence *always in combination with the most insoluble constituents of the primordial rocks.* One need not, therefore, be surprised at finding that the average content of the lithium salts in mineral springs is not more than four parts in 100,000 of water, or say one grain in three and one-quarter pints.

"Despite the long list of 'lithia springs,' whose advertisements

we find in the medical and secular journals of the day, the actual number of those containing upward of four grains of lithium bicarbonate (equal to about two and five-tenths grains of the dry carbonate) to the gallon, is but fifteen," and this amount has been reduced by more recent analyses in which more accurate methods for the estimation of lithium were followed.

The physiologic investigations of the last decade into the nature of uric acid, and the importance of the rôle played by it in the human economy, have maintained and even intensified the interest in the therapeutic value of the behavior of the salts of lithium towards this acid, first introduced by Garrod and sustained by his successors. The opposition to the views of Garrod, which sprung up years ago, culminated two years since in an elaborate work by Dr. Alexander Haig ("On Uric Acid," 1892), who undertook to prove experimentally on his own person that lithium, administered for the elimination of uric acid from the system, not only failed to accomplish the purpose, but "diminished the excretion of uric acid." In defense of this position he quotes from Rose to the effect that lithium forms "insoluble compounds with phosphate of soda and triple phosphate of ammonia and soda, salts generally present in animal fluids." The work of Rose has not been accessible to me, and I, therefore, am not in a position to assert whether or not Haig properly quoted or understood him, but I find that Dr. Halberstadt asserts that "sodium phosphate causes, in *not too attenuated* solutions of lithium salts, a crystalline precipitate of normal lithium phosphate;" and Sir Dyce Duckworth states that "the normal and biurate of lithium easily dissolve in alkaline fluids, also in phosphate of sodium."

This is in accordance with my own experience, but I found also by actual experiment that no precipitation took place, even after several days, when such solutions are further diluted to one part in 250 or more parts of water before being mixed. When we take into consideration the minute amounts of sodium phosphate and lithium salts that can possibly meet in the blood-serum at any given moment, and that each meeting must occur in rapid motion, we must conclude that other causes have been instrumental in producing the results of Dr. Haig's experiments.

Another protest against the conclusions of Haig was recently published by a well-known French pharmacist, M. P. Ardoue, in

L'Union Pharmaceutique (quoted in the *National Druggist*, Vol. xxi, p. 162), who records a case of gouty rheumatism, in which he had examined the urine of the patient before, during and after treatment, and determined a very decidedly favorable action of lithium salt in the excretion of uric acid.

The four experiments of Gorsky ought to be mentioned also, which he carried out in the year 1889, at the laboratory of Loersch at St. Petersburg, on healthy men, each lasting twenty-four days, and by which he arrived at the conclusion that "carbonate of lithia administered in gradually ascending doses, from two to eight grains a day with an effervescent water, increased the daily amount of urine and with it the daily amount of the excretion of uric acid;" and he continues, "it is very probable that lithia favors the transformation of uric acid into urea, and, hence, by freeing the system from the acid, promotes a more energetic cellular action." It would, therefore, seem that the usefulness of lithium salts as a therapeutic agent had not yet outlived itself; but, on the contrary, that the salts will long continue to be employed as a great alleviator of human suffering.

CENTRAL (AXIAL) ILLUMINATION.

By Hans M. Wilder.

It will probably surprise the average microscopist to learn that he very likely never has used strictly central light. One should think that by keeping the mirror-bar accurately in line with the body-tube, and having the field evenly lighted, the illumination must necessarily be central. It is so after a fashion, but in most cases the illumination is as much as 5 to 10 degrees out of centre.

S. Gage, in his admirable "Microscopical Methods," recommends to beat thin mucilage until milky, transfer a little to the slide, and put on a cover-glass, without pressing it down. Search the preparation until an air bubble is found of an apparent diameter of one Mm., get it in the centre of the field, and apply the plane mirror. If central, the bright spot will be found exactly in the centre of a dark circular ring; if not, then adjust the mirror until it is.

I think that the following method will be found easier of execution: Whatever the object under the microscope, select a spot in the

centre, and move the fine adjustment screw back and forth. If the illumination is central, then the image will disappear and reappear in a vertical direction, while, when out of axis, the image will "wobble" either to the right or left. Adjust the mirror and the relative position of the source of illumination (if feasible), until the image moves vertically. This method presupposes that the micrometer screw works true. In order to find out whether this be the case, combine both methods: Make the illumination central by the first method, and then see whether the image wobbles on focussing up and down; it should, of course, not do so.

REPORT ON GINGER CROPS IN JAMAICA.[1]

By William Fawcett,
Director of the Botanical Department.

The quality of commercial ginger upon which the price depends is due chiefly to soil, but also to curing, to the variety, white or blue, and to whether it has been freshly planted a few months before or has been "ratooning"[2] for one or more years.

The soil which produces the very highest quality, realizing perhaps £10 per cwt. in London market, is the very deep black soil of the virgin forest.

Magnificent trees, six feet in diameter, may be seen in some districts lying rotting on the ground, while the ginger cultivators have gone further to the centre of the island, abandoning the woodlands already cut down. The plan adopted in cleaning the forest is, for a cultivator to invite 10 to 12 of his friends to a "cutting match;" he provides food and drink, and the laborious work of felling trees is carried on merrily and without much expense. Afterwards fire is put, and the place is burnt over. This burning is considered very important, as much so as the virgin soil. Probably its importance is due principally to the deposit of potash and other mineral matters contained in the ashes, but the fire will also sweeten the ground, correcting sourness, and moreover it destroys insect pests. Some cultivators will only grow ginger in freshly-cleared woodland and next year they move on to a new clearing, but although in this way

---

[1] From Bulletin of the Botanical Department, Jamaica. Vol. I. Part 6.

[2] Ratoon ginger is that which has grown on the same ground for two or more years.

they get very fine ginger, it is at the expense of forest land which would require a very heavy outlay and perhaps a term of a hundred years to restore. Albert Town was not so long ago a centre for the cultivation, but I was told there that growers had already got as far as fourteen miles further inland.

Ginger can be and is grown in many places year after year on the same ground. An intelligent cultivator at Borobridge stated that he knew of ginger growing for forty years in the same patch.

Seaford Town is a German colony, and one of the original colonists, Somers, an active old man of 86 years of age, has been cultivating ginger and arrowroot there since his youth; he and the other colonists have been in the habit of planting a small patch one year, leaving it to ratoon as long as it was profitable, then throwing it up or growing other plants until after a term of years they again plant the same patch with ginger. This is an irregular rotation of crops. "Plant ginger," the produce of planting, is of better quality than the ratoons, and the ratoons in each succeeding year are inferior. When the ground is too poor to grow "white ginger" then "blue ginger," the inferior variety, can be grown.

More depends upon the curing of ginger, considering the raising of the crop as a means of making a livelihood, than soil. At Seaford Town there was a wet season about two years ago, the people could not dry the ginger in the sun, it mildewed, there was consequently very little sale, and the cultivators suffered some distress. I believe from what I saw that, as a rule, careful attention is given to the curing, and that the badly cured ginger brought sometimes to market is due to wet weather rather than to want of care.

It is difficult to make any recommendations on the subject, but the following hints may indicate what points are worthy of consideration by the cultivators. The first is the application of manure. There is a prejudice against its use, some maintaining that it breeds worms, and there is a difficulty also in getting it in any quantity. It is probable that those who have not succeeded with manure have used it improperly by applying it fresh or not sufficiently mixed with soil. As to obtaining it in quantity, example should be taken from the Chinese laborer who preserves every particle of matter that can in any way be utilized as manure, not only cattle manure, but decaying matter of any kind, night-soil, etc., even soapy water left after washing is most useful. To imitate the formation of forest

soil, a pit might be filled with alternate layers of bush and manure everything in the nature of manure or decaying matter should be thrown in, and a layer of soil directly over the manure would be useful. The pit ought to be lined with clay to prevent the very valuable part of the liquid of the manure from escaping, and a cover of some kind, *e. g.*, a sheet of corrugated iron, should be fixed in some way over the pit to keep out rains. I noticed several head of cattle in the Seaford Town district, and apparently the manure is lost, because the cattle wander about in search of food. Possibly grass or clover might be grown in old ginger grounds, and the cattle tethered so as to confine them in one place and the manure easily collected.

To facilitate curing and even sometimes to save the crop, the chief storekeeper in a district, who buys the ginger, might find it advantageous to himself and the people to invest in an American evaporator and dry the ginger artificially.

Possibly the Government could take steps through the Surveyor-General to prevent the forests from being ruthlessly destroyed.

The export of ginger is, on the whole, on the increase, as seen from the following table, but if this is accompanied by the gradual destruction of woods and forests it is not a subject for congratulation.

Year.	Cwt.	Value.
1887	9,927	£17,789
1888	10,222	19,463
1889	8,952	18,615
1890 (one half year)	4,948	11,133
1891	10,885	24,493
1892	16,272	40,681
1893	13,632	27,264
1894	14,932	44,796

A DANGEROUS EXPERIMENT.

An explosion occurred in a drug store in this city recently, resulting in an injury which came near to the destruction of the eyesight of the person injured.

A druggist was experimenting on the action of ammonia water with oxide of silver, and had left the mixture in a porcelain capsule covered with water and a glass stirring rod in the capsule.

A salesman coming into the store thoughtlessly took up the rod and without agitation was replacing it in the capsule when a violent explosion occurred, shattering the capsule, pieces of which

struck him in the face, causing damage which it was feared would result in the loss of one or of both eyes. Prompt and skilful treatment, however, warded off the threatening mischief, and no permanent injury resulted.

The product obtained by the action of ammonia on silver oxide, known as "Berthollet's Vulminating Silver," is a dangerous article. When dry it explodes violently on the slightest percussion, or even when touched with a feather. The black crystals having a metallic lustre decompose violently with detonation when the liquid containing them is shaken.

The exact composition of the compound has not yet been ascertained.

IRISH MOSS.

By Thomas S. Wiegand.

A little town, known as Jericho, in Massachusetts, seems to be the centre of this industry. We gather these notes from a paper which was printed lately in the Boston *Herald.*

Boys, men and women all engage in the work, which consists in spreading it upon the beach prepared by raking all the dirt, stones and driftwood away, and leaving a fine bed of white sand; when the weed is first brought in by the boats, each of which gets about a barrel and a half, it is taken upon creels, a sort of barrow, and spread out upon the beach; it is turned over daily as in hay-making, for the space of two weeks; each morning it is washed in clean sea-water (fresh water ruins it); it is then gradually bleached, as when first gathered it is of a light-green color, and in the course of a few weeks becomes successively red, pink, and finally nearly white.

Stormy weather is a great drawback to the mosser's work. Some of the moss that the storms tear loose and scatter upon the rocks is gathered and classed as hand-picked, bringing generally a quarter or one half cent per pound more than that gathered in the usual way for commerce.

Should a spell of rainy weather come on during the season of gathering, heavy unbleached muslin covers are used to protect the moss, which is packed up in heaps.

Two crops are obtained each year, the first one being the better; the late crop is liable to be injured by a little black vegetable growth called glut, caused, it is said, by the warmer water of August days.

EDITORIAL.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The *Section on Scientific Papers*, through its chairman, has issued a circular letter in reference to the OBSERVATION SHEET proposed by President E. L. Patch, at the Asheville meeting.

The purpose of this sheet is to assist pharmacists in collecting and tabulating a series of data upon incompatibilities, difficult problems and experiences of all kinds in compounding and dispensing drugs, and how they were solved; upon the relative salability and therapeutic value of the various new remedies; upon the condition of the various products purchased by the pharmacist, his experience with the formulas of the Pharmacopœia, National Formulary, etc., as well as errors or difficulties of any kind found in the Pharmacopœia, Dispensatories, or elsewhere.

The sheet is printed on four pages, with space to write down answers under the following:

THE PRESCRIPTION.
THE STORE.
THE LABORATORY.—A. Unsatisfactory products.
THE LABORATORY.—B. Errors in formulas.

There is something new and practical in offering pharmacists this method of recording their experiences, and we hope to hear a valuable report on the subject at the next meeting of the Association. Copies of the Observation Sheet may be obtained by addressing Dr. A. R. L. Dohme, Chairman of the Section, 303 West Pratt Street, Baltimore, Md.

Professor Dr. G. Dragendorff will sever his connection with the University of Dorpat, Russia, in December, and will, for a time at least, reside in Rostock, Mecklenburg, Germany.

The Oklahoma Pharmaceutical Association met in El Reno, Okla., October 5, 1894. W. S. Mayfield, of Norman, Okla., was chosen President, and Edwin De Barr, Secretary. The next meeting will be held in Perry, Okla., in July or August, 1895.

It may be of interest to readers of the AMERICAN JOURNAL OF PHARMACY to learn that the number of students in attendance at the *Philadelphia College of Pharmacy* is something over 750. Over 40 per cent. of these come from outside the State of Pennsylvania.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Practical Uranalysis and Urinary Diagnosis. By Charles W. Purdy, M.D. The F. A. Davis Company, Philadelphia. 1894. Pp. 357.

If the author had possessed a more exact knowledge of the science of chemistry, he might have written a book that would have been a necessity to every one studying this subject practically. We do not like his loose chemical nomenclature, as illustrated by calling stronger ammonia water "strong ammo-

nium (U.S.P)." "Caustic potassium" is neither the correct popular name nor the correct scientific title for potassium hydrate.

The author gives his own method for the estimation of glucose. It is volumetrically determined by an ammoniacal Fehling's solution. We do not believe that any one in following his method will obtain "a perfectly *transparent and colorless*" end reaction, unless phosphates are first removed, and nothing is said about that. As long as physicians adhere to the volumetric process for estimation of glucose, just so long will they be disappointed. The gravimetric method is the only one that will give exact results, and there is nothing said about it in this work.

We are inclined to overlook the chemical shortcomings when we consider the excellent illustrations, and the appendix, which is devoted to the examination of urine for life insurance.

Modern Materia Medica. By H. Helbing, F.C.S. Fourth enlarged edition. New York: Lehn & Fink. London: H. K. Lewis. Pp. 295.

In the two years that have elapsed since the publication of the third edition, the list of synthetic remedies has been enormously increased, yet the author has endeavored to include them, and with fair success.

Two additional tables have been added in this edition, which greatly enhance the value of the work, namely, a table for the detection of the new remedies in urine, and a table of commercial names.

To illustrate how closely this work has been revised, we may state that a page is devoted to *diphtheria antitoxine*, wherein one may learn the nature and source of this substance, as well as its properties and uses.

Every pharmacist should have this work within easy reach, and he will not then be "all at sea" when a prescription is presented for a new remedy which he may easily have missed hearing about.

The Manufacture of Liquors and Preserves. Translated from the French of J. De Brevans. New York: Munn & Co.

The value of this work consists in the large number of formulas contained in it.

A Text-Book of Volumetric Analysis. By Henry W. Schimpf, Ph.G. New York: John Wiley & Sons. 1894. Pp. 400.

An American text-book of 400 pages has long been needed. This one strikes us as partly meeting that requirement. When, however, the author undertakes gasometric analysis he fails to make it full enough to be of much value to either the pharmacist or the pharmacy student. We fail to understand what place the chapter on glucosides, of less than a page, has in a book on volumetric analysis. It is also misleading to consider milk as a substance to be estimated volumetrically. The same may be said of a page devoted to the analysis of urinary calculi, which was taken from Muter's "Analytical Chemistry."

Volumetric analysis has its limitations, and if the author will revise with that fact more prominently in view, he may yet produce a standard text-book.

Consular Reports. Vol. XLVI, No. 169.

The most interesting report in this number is that on the cultivation of "Chicory in Belgium." We learn that Belgium produces annually 280,000 to

350,000 tons of this adulterant for coffee; 4,000 tons are sent to the United States.

Syllabus of Lectures on Human Embryology: an introduction to the study of Obstetrics and Gynæcology. For Medical Students and Practitioners. With a Glossary of Embryological Terms. By Walter Porter Manton, M.D. Illustrated with seventy (70) outline drawings and photo-engravings. 12mo. Cloth. Pp. 126. Philadelphia: The F. A. Davis Company.

The above work, which gives, in a clear, concise and well-illustrated manner, the essential facts of human embryology, is well adapted to the needs of the busy medical student. It is so arranged that it can be used in the class-room by the teacher if desired.

An interesting section is added, giving instruction for practical work.

C. B. L.

Proceedings of the New York State Pharmaceutical Association. An account of this meeting was given in the August number of this journal.

Proceedings of the Tenth Annual Meeting of the Minnesota State Pharmaceutical Association, held in June, 1894.

Semi-annual Report of Schimmel & Co., Leipzig and New York, October, 1894.

Pharmacy a Science. Introductory address before the Albany College of Pharmacy. By Willis G. Tucker, M.D., October, 1894.

Proceedings of the American Academy of Arts and Sciences. From May, 1893, to May, 1894. Boston, 1894.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 20, 1894.

The meeting was called to order by electing Dr. A. W. Miller as chairman.

The reading of the minutes was dispensed with. Dr. Judson Daland explained to the meeting the structure and use of an instrument invented by him, called the Hæmatokrit. The instrument depends upon the effect of centrifugal force carrying the heavier portions of the blood to the further portion of the capillary tube, that by means of a system of multiplying wheels is made to revolve 10,000 times in a minute, this enables the operator to examine the blood so as to detect any variations which a sample of blood submitted to inspection may have when compared with a sample of normal blood. At first it was supposed to be necessary to dilute the blood in order to inspect it, and a 2½ per cent. solution of potassium bichromate was employed; but this was abandoned. It was found by experiment that 51·6 per cent. by volume were corpuscles, the red corpuscles being at the furthest extremity of the tube and the white corpuscles arranged next to them. Their relation being as one white to five hundred red corpuscles—to effect this properly the handle should be revolved seventy-seven times in a minute; if the measuring tube is not revolved with sufficient rapidity, the corpuscles will be too loosely packed, and the indication will not be fair and true. The excellence of this instrument over the usual mode of estimation by micrometer counting is very great, as a truthful result can be

obtained in a few minutes, while counting with a microscope occupies some two hours of most tiresome, nerve-wearing labor.

A vote of thanks to Dr. Daland was given unanimously for the interesting description of the instrument and its methods of use.

Mr. Wm. B. Thompson, secretary of the College, presented volumes of the Pennsylvania State Board of Health Reports, which he had received from Dr. Benj. Lea, secretary of that body.

Mr. England presented on behalf of Mr. Bullock, president of the College, a specimen of saigon cinnamon of very fine quality, also leaves and fruit of the Sophora Speciosa, a plant growing in Texas, the alkaloid of which was examined by Dr. H. C. Wood, of the University of Pennsylvania, some years since.

Mr. Thompson read a few notes on subjects of great interest to pharmacists, especially that of the use of *acetic acid in the preparation of fluid extracts*, advocating the systematic study of this menstruum for exhausting many drugs that are now only treated with alcoholic menstrua, pointing out the advantage which would accrue to the trade at large should such experiments prove that the advantage anticipated could be obtained. Its solvent power is very much greater in some cases than that of alcohol, but it would be premature, from any experiments yet made, to conclude its universal adoption advisable. Prof. Remington stated that a number of experiments had been made by Dr. Squibb on a variety of substances—particularly nux vomica—and a number of spices and flavoring materials, with very good results, so also with some of the alkaloidal drugs (cinchona excepted especially). It also promises favorable results for solid extracts, as the acid would be entirely dissipated in the concentration. Before such extracts can supplant the present solid extracts close study and careful experimentation will be required.

A short summary of the *Chemical remedies*, which have been lately vaunted so freely, was given.

Flesh extracts also were reviewed, showing the tendency of such methods and their uselessness, while a more rational employment for the truly educated pharmacist was pointed out in the study of plant foods or soil analysis as being of incalculable value to the agriculturist, who would intelligently direct his labors in enriching the soils and gaining plenteous harvests to reward his toils.

The question of the value of those preparations of cod-liver oil which contain no oil was brought up, and the expression of those best informed was that cod liver oil was in no sense a medicine, but a food readily assimilated by many whose digestive apparatus was unable to assimilate any other fat oils; the theories of the chemical constituents of cod-liver oil being extracted and given in condensed forms has been long relinquished.

The use of pure olive oil was noted as being useful in the same way, and one of the physicians of the Philadelphia Hospital gives with advantage an emulsion of olive oil and eggs to infants suffering with marasmus.

Attention was called to the *Observation Sheets* which had been proposed by Professor Patch, of Boston, intended to be used by the pharmacist or manufacturer in noting difficulties experienced in the routine of his business and the ways adopted for remedying the same.

The character of cinnamon and cassia was commented on, one stating that the only cinnamon he could use was Ceylon, as it had a fine flavor, while most of that offered as cassia was like so much inert matter.

Batavia cinnamon, which was in the market at one time, was destitute of any cinnamon flavor, and was even mucilaginous.

But those who deal in spices largely are now in the habit of adding saigon cinnamon to the ordinary cassias when having them ground—and those who use this spice (the bakers) find this cinnamon to give the flavor they require for their business. It was thought that the low-grade cassias had been already partly deprived of their flavor before being sent abroad—another instance of Chinese sharpness of a vicious kind.

The Committee on Tax-free Alcohol reported progress, and presented a circular letter (see below), which they are sending to pharmacists throughout this section of the United States.

Specimens of different varieties of petrolatum were exhibited by Mr. Jos. W. England, and attention was called to them.

There being no further business, an adjournment was ordered.

T. S. WIEGAND, *Registrar.*

CIRCULAR LETTER TO PHARMACISTS.

COMMITTEE ON ALCOHOL LEGISLATION.

PHILADELPHIA COLLEGE OF PHARMACY,
145 NORTH TENTH STREET, PHILADELPHIA.

DEAR SIR:—At a meeting of Pharmacists held at the Philadelphia College of Pharmacy on Tuesday, October 16, 1894, the section of the Tariff Bill enacted on August 28 last, relating to the repayment of tax on alcohol used for manufacturing purposes was discussed.

The section reads as follows:

"SECTION 61.—Any manufacturer finding it necessary to use alcohol in the arts, or in any medicinal or other like compound, may use the same under regulations to be prescribed by the Secretary of the Treasury, and on satisfying the collector of internal revenue for the district wherein he resides or carries on business that he has complied with such regulations and has used such alcohol therein, and exhibiting and delivering up the stamps which show that a tax has been paid thereon, shall be entitled to receive from the Treasury of the United States a rebate or re-payment of the tax so paid."

Resolutions were unanimously adopted asserting the desirability of having enforced the law relating to rebate of tax on alcohol used in making medicinal preparations. The members of the Philadelphia College of Pharmacy placed themselves on record as favoring tax-free alcohol for manufacturing purposes, and urged pharmacists to work in the interest of having the law retained and enforced, instead of being repealed.

At that meeting the undersigned were appointed a committee to place the question of tax-free alcohol before the retail pharmacists of the country, and to endeavor to have their views upon this matter of vital interest to their business properly presented to Congress and the executive officers of the Government.

It was stated that the wholesaler, the manufacturing pharmacist and the patent medicine manufacturer had all presented their views, but that retail

pharmacists had not expressed their opinions, although, in point of numbers and legitimate use of alcohol in preparing medicinal preparations, they were more concerned than any other class of manufacturers.

The present tax on alcohol, $1.10 a proof gallon, amounts to $2.09 on every gallon of 95 per cent. alcohol, and this represents in many medicinal preparations the largest item of cost. According to our best information, there are about 40,000 drug stores in the United States. A very conservative estimate, it is believed, of the amount of alcohol used by each one annually in preparing medicines, would be two barrels of forty gallons each.

Such an allowance would indicate that the Government will collect as a tax from this source during the present year $6,688,000. The cost of our preparations are thus artificially increased to this extent, necessitating the employment of a large amount of capital from which no profit is derived.

During the year 1893, alcohol was supplied to the retail drug trade in Philadelphia at an average price of $2.18, of which amount but thirty-nine cents represented the cost of the alcohol, and $1.79 the tax on each gallon. This will give some idea of the degree to which medicinal preparations have been unjustly enhanced in value by the retention of the high tax on alcohol, and from this we ask relief.

We have no solvent that will take the place of alcohol in the extraction of most drugs; and in the preparations into which it enters, it becomes as much a part of the medicine as the contained drugs or chemicals. To no other cause so much as to the high tax on alcohol, extending over a period of more than thirty years, can be attributed the fact that the retail pharmacist has been largely diverted from the true character of his business.

The difficulty of recovering alcohol used in the manufacture of preparations on the small scale, has rendered this part of his calling no longer profitable, as he could not compete with the large manufacturer with facilities for working on an extensive scale. As a consequence, the manufacturer has flourished, and deprived the retailer of a large portion of his legitimate occupation.

With tax-free alcohol at thirty-five to fifty cents a gallon, every pharmacist could economically and correctly prepare his own medicinal preparations and would be responsible for their purity; and thus the public would be protected from fraud. Tax-free alcohol would undoubtedly greatly improve and extend our knowledge of pharmacy.

It is the retail druggist who directly supplies the needs of the public, and through him it will derive such benefit as will result from the enforcement of this act. Some manufacturers have urged upon the Secretary of the Treasury such a restrictive application of the law as would exclude the retail druggist from its benefits. This, the very class through whom the benefits will be disseminated, and whose claim from a moral and economical standpoint should be the strongest, must now assert themselves, lest they be entirely ignored and excluded from sharing in the advantages of the act.

While the law has been enacted, this particular section requires that regulations are to be prescribed by the Secretary of the Treasury, and as such regulations have not been framed, it remains inoperative. The reasons assigned for the non-enforcement of this section of the act are:

(1) The loss of revenue that would legitimately occur if the section is

enforced. The amount of tax collected by the Government from this source, as shown above, is large; but, surely, this argument entirely loses its force, if we but stop to think who ultimately pays this tribute-money—the sick, the infirm, the wounded, the dying. Can we admit for one moment that the most enlightened nation of the nineteenth century finds it necessary to place a penalty upon her unfortunate sick? Surely such a barbarity cannot be defended and continued by an American Congress.

(2) The difficulty of framing regulations that would permit those entitled to receive the rebate provided for by the act, and at the same time amply protect the Government from imposition and fraud. This has been magnified into an insurmountable mountain. The Government has here a task, we believe, no more difficult than that of preventing illicit distilling, illegal brewing or manufacture of tobacco, with all of which it has successfully dealt. This Committee is not willing to admit that the great body of American pharmacists are not honest and ready to uphold any just regulations that may be imposed by the Treasury Department in the enforcement of this act. Pharmacists do not desire a rebate of the tax on alcohol entering consumption as cordials, bitters and beverages, nor on spirituous, distilled or malted liquors sold as such, but only on such alcohol as is legitimately used in the manufacture of medicinal preparations.

While hardly within the province of this Committee to outline regulations for the Secretary of the Treasury, we have reason to believe that any practical suggestions would be welcome. The Committee is of the opinion that regulations can be adopted as safeguards against the improper usage of alcohol on which tax is rebated, and has in mind already an outline of what those regulations should be, and would request suggestions from others on this subject.

(3) The neglect of Congress to make the necessary appropriation for carrying this section of the law into effect. This objection is not a permanent one, and can be easily remedied at the next session of that body. The cost of enforcing this section of the law will depend largely upon the regulations prescribed, but we have no reason to believe that it will be unduly large.

The Committee would urge upon every druggist the necessity of exerting his influence in the direction of having this law enforced. We ask you to personally present this subject in all its bearings on pharmacy to the attention of your Congressional Representatives. The Committee requests the attention of pharmaceutical journals and pharmaceutical associations to this, the most important question affecting pharmacists that has arisen in years. We solicit your earnest co-operation. Get every pharmacist thoroughly aroused to its importance, and urge upon him the necessity of concerted action toward securing the necessary legislation to make the law operative.

The Committee requests that every druggist promptly send answers to the following: (Address your replies to the "Committee on Alcohol Legislation," Philadelphia College of Pharmacy, 145 North Tenth Street, Philadelphia, Pa.)

(1) What classes of pharmaceutical preparations do you now prepare?

(2) With tax-free alcohol what others would you prepare?

(3) How much alcohol do you estimate that you have used in the manufacture of pharmaceutical preparations only during the year 1893?

(4) What suggestions do you offer as to the character of the regulations that should be prescribed by the Treasury Department to prevent fraud?

Yours respectfully,

GEORGE M. BERINGER,
Chairman.
WILLIAM MCINTYRE,
ROBERT ENGLAND,
RUSH P. MARSHALL,
JOSEPH W. ENGLAND,
Secretary.
Committee on Alcohol Legislation.

PHILADELPHIA, November 1, 1894.

OBITUARY.

William Silver Thompson died at his home in Waverly, near Baltimore, Md., on Wednesday evening, October 31, 1894. He was a member of the drug firm of Andrews & Thompson, and was at one time president of the Maryland College of Pharmacy. He was also a member of the American Pharmaceutical Association, the Maryland Historical Society and the Maryland Academy of Sciences. The deceased had been a druggist fifty-five years. He was born in New Castle County, Del., in 1823, and went to Baltimore to engage in business when he was sixteen years of age.

The Maryland College of Pharmacy passed suitable resolutions concerning the deceased.

Dodder.—These plants, belonging botanically to the genus *Cuscuta*, are among the most troublesome of parasitic weeds to the gardener and farmer in the Old World. Some of the species have become so destructive in French agriculture and horticulture, that the Prefect of one of the large provinces, *Charente-Inferieure*, has issued instructions, which are circulated freely among cultivators, making it obligatory on every one to destroy the plants wherever seen. The mandate is accompanied by descriptions by which the cultivators may know the pests as soon as they have begun their growth. It is remarkable that the plant is an annual, and commences its growth by seed in the ground as ordinary plants do; but after they find something to attach themselves to, they draw their sustenance from the host plant, and then the connection between the plant and the soil dries up, and the plant is completely severed from its terrestrial connections. The plant belongs to the natural order of *Convolvulaceæ*, that is to say, the section to which the common morning-glory belongs, and some of these, as, for instance, in the common moon-flower, have warty excrescences along their stems which some have supposed to be young, abortive, ærial rootlets. A recent communication to a scientific society considers these excrescences to be incipient haustoria, which is the name given to the little suckers which are thrown out from the dodder, and which penetrate the host plant and furnish food to the parasite. In other words, it might be stated that these morning-glories are in an incipient state of evolution toward the parasitic condition.—*Meehan's Monthly, for November, 1894.*

INDEX

TO VOL. LXVI (VOL. XXIV, FOURTH SERIES) OF THE AMERICAN JOURNAL OF PHARMACY.

FOUNDED A. D. 1818.

LOCAL AND LONG DISTANCE TELEPHONES.

POWERS & WEIGHTMAN,

MANUFACTURING CHEMISTS,

NEW YORK,
56 Maiden Lane.

Philadelphia,

Offer to the Wholesale Drug Trade, and to those who buy in similar quantities, a general assortment of

CHEMICALS

Medicinal, Photographic, and for the Arts.

MORPHINE--Sulphate, Muriate, Acetate, etc.

QUININE, QUINIDINE, CINCHONINE, CINCHONIDINE, in all their forms.

STRICTLY OF OUR OWN MANUFACTURE.

CALOMEL, CORROSIVE SUBLIMATE,
RED AND WHITE PRECIPITATE, and other

MERCURIAL PREPARATIONS.

ACIDS--Acetic, Citric, Sulphuric, Tartaric, etc.

Strychnine. Nitrate of Silver. Chloroform.

Glycerine. Ethers. Hoffmann's Anodyne.

Water Ammonia, 16°, 20°, 26°. Blue Vitriol.

Alum. Epsom and Rochelle Salts. Seidlitz Mixture

Etc., Etc., Etc., Etc., Etc.

Materia Medica Collection

For Students of Pharmacy and Medicine.

The student can familiarize himself practically with the properties of drugs *only as he has the opportunity to examine and handle specimens himself.* The descriptions in text-books, even when aided by elaborate engravings, appeal only to the imagination, and the impression received from reading is consequently of necessity imperfect—often misleading and generally evanescent. It is not enough, even, that the student have access to cabinet collections, although these render excellent educational service. *It is only by having the specimen actually in hand, that, with the aid of lens and dissecting-needle, he can intelligently follow the descriptions of his manual.*

LENGTH OF CASE, 28 INCHES; WIDTH, 18¼ INCHES; DEPTH, 14 INCHES.

MATERIAL, ANTIQUE OAK, JAPANNED TIN BOXES, WITH ROUND GLASS TOPS.

THIS MATERIA MEDICA COLLECTION

Contains specimens of all crude drugs of vegetable origin recognized in the Pharmacopœia, and many not so recognized that are in common use—in all, 288 specimens—thus furnishing an indispensable supplement to such works as the Dispensatories, Maisch's Manual, Sayre's Conspectus of Organic Materia Medica, etc., etc.

Each specimen is put up in a little box, with a label bearing simply a number—three indexes or keys (Numerical, Botanical and Vernacular) accompanying the case. The indexes, being alphabetically and numerically arranged, enable the student to find any required specimen without difficulty, while the absence of names on the labels enables him to practise himself in the identification of drugs.

Price of the Collection: $25.00 Net, F. O. B. Detroit.

PARKE, DAVIS & CO.

Detroit, New York, Kansas City, U. S. A., and Walkerville, Ont.

WHAT WE WILL DO.

During the year 1895 the

American Journal of Pharmacy

will add to its list of well-known contributors.

It will amplify the illustrative features commenced in 1894.

It will continue to review all the best books in pharmaceutical literature.

It will print an abundance of original matter from the pens of the best-known writers on pharmacy.

It will be a Pharmaceutical Magazine.

Practical Pharmacy,
Economic Botany,
Pharmaceutical Chemistry,
Industrial Chemistry,

will each receive a full share of consideration.

Subscribe Now for 1895.

We do not offer to each subscriber a ton of coal or a bushel of potatoes. We presume, when you subscribe for the AMERICAN JOURNAL OF PHARMACY, that you want pharmaceutical literature and not a chromo.

We Offer No Premiums.

We give you what you pay for. We do not hopelessly mix reading matter, "trade notices" and advertisements.

BACK VOLUMES

—OF THE—

AMERICAN JOURNAL OF PHARMACY.

To enable the readers of the AMERICAN JOURNAL OF PHARMACY to complete as much as possible their sets of the first forty-two volumes, for which a complete *General Index* has been published the Publishing Committee offer until further notice, the following volumes and single numbers at the *Reduced Rates* mentioned below:

Issued Quarterly, in numbers of 96 pages each.

One Dollar per Volume.

Volume	8 —	1836.
"	9 —	1837.
"	10 —	1838.
"	11 —	1839.
"	12 —	1840.
"	14 —	1842.
"	17 —	1845.
"	20 —	1848.
"	21 —	1849.
"	22 —	1850.
"	23 —	1851.
"	24 —	1852.

Issued Bi-monthly, in numbers of 96 pages each.

One Dollar and fifty cents per Volume.

Volume	25 —	1853.
"	26 —	1854.
"	27 —	1855.
"	30 —	1858.
"	31 —	1859.
"	32 —	1860.
"	33 —	1861.
"	34 —	1862.
"	35 —	1863.
"	38 —	1866.
"	40 —	1868.
"	41 —	1869.

SINGLE NUMBERS TWENTY-FIVE CENTS EACH

Volume	1 —	1829.	Numbers,	1, 2, 3.
"	3 —	1831.	"	3, 4.
"	4 —	1832.	"	2, 3, 4.
"	5 —	1833.	"	2, 3.
"	13 —	1841.	"	2, 3, 4.
"	15 —	1843.	"	1, 2, 3.
"	16 —	1844.	"	2.
"	18 —	1846.	"	2, 3, 4.
"	19 —	1847.	"	2, 3, 4.
"	28 —	1856.	"	1, 3, 4, 5, 6.
"	29 —	1857.	"	2, 3, 5, 6.
"	36 —	1864.	"	2, 3, 4, 5, 6.
"	37 —	1865.	"	3, 5.
"	38 —	1866.	"	2, 3, 4, 5, 6.
"	39 —	1867.	"	2, 4, 5, 6.
"	42 —	1870.	"	2, 3, 6.

Most of the volumes and numbers in the above list can be supplied to a *limited extent only*, and some few of those *not enumerated*, the Committee are desirous to purchase, and invite those who may have them to spare, to communicate with the *Business Editor*

Diphtheria Antitoxine Solution

Many physicians apply to us for information concerning the r v Diphtheria Antitoxine Remedies. Supposing that a clear and terse explanation will interest all, we take pleasure in supplying the following facts: There are three Diphtheria Antitoxines now in the market—Behring's, Aronson's and Roux's.

Behring's solution is supplied in three strengths, designated Nos. 1, 2 and 3. The No. 1 is recommended in treatment of diphtheria in children under ten years of age, if seen on the first, second or third day, and for all incipient cases; advanced cases require repeated injections of the No. 1 solution or equivalent single injections of No. 2 or 3. The injections should be made with the well-known Koch Syringe, and preferably under the ribs, in the loins or the inner surface of the thighs. This Antitoxine is perfectly innocuous. It induces no local or general disturbance. A vial of No. 1 contains 10 cubic centimeters, which is equal to 600 antitoxine normals, and is sufficient for one case; No. 2 contains the equivalent of 1,000 antitoxine normals; No. 3 contains 1,500 antitoxine normals. The dose to be injected as a prophylactic to persons liable to be exposed to Diphtheria is set down by Behring at 60 antitoxine normals, or one-tenth the contents of a vial of No. 1; after infection, that is, during the incubation stage, he believes that 150 antitoxine normals ought to avert the development of the disease. The solution should be protected from light, and stored in a cool place; with proper care the solution will keep well for several months. The addition of 0·5 per cent. carbolic acid will prevent change of the solution through micro-organism. Supplies of No. 1 and No. 2 of this antitoxine are under way in consecutive installments, the first installment having arrived in New York October 22d, and we expect more at frequent intervals.

Roux's is prepared in the Pasteur Institute of Paris, and was introduced to the attention of the medical profession through a detailed medical report by the author before the late Hygienic Congress at Buda-Pest. This product is presumably identical with Behring's. It is not yet obtainable here, and we do not know how soon it will be available, since all the product manufactured is apparently reserved for use in France at present. President Casimir-Perrier visited the Pasteur Institute in Paris October 23d, and conferred upon Dr. Roux the Cross of Commander of the Legion of Honor. In replying, Dr. Roux praised the German bacteriologists Behring and Loeffler, whom he credited with being the real discoverers of the new remedies. This confirms the identity of Behring's and Roux's products, and the latter will, presumably, therefore, not be sold in the United States.

Aronson's is made by Schering, of Berlin, and was the first of the three actually supplied in this country. Stock was available in New York in September, but it was exhausted in the first week of October. Additional supplies may come within a week or two. This preparation is of one strength only, and is supplied in 2-gramme vials and in 5-gramme vials. This Aronson's Antitoxine Solution, it is stated, will assure immunity against diphtheria in children and adults by injection from ½ to 1 cubic centimetre. The application is made by a single injection by means of a sterilized syringe, and 1 cubic centimetre is sufficient for children and adults, while ½ cubic centimetre will suffice for small children. In advanced cases the doses are repeated once or twice. In Germany public collections are being made through the press for the purpose of buying this remedy, and supplying it free for the treatment of the poor.

Vol. 66 AMERICAN No.

JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

HENRY TRIMBLE, Ph.M., Editor.

Publishing Committee:

HENRY H. RITTENHOUSE, SAMUEL P. SADTLER, WALLACE PROCTER, JOSEPH W. ENGLAND, AND THE EDITOR.

Fourth Series. DECEMBER, 1894. Vol. LXVI, No. 12

CONTENTS.

Price, $3 per Annum, in advance. Issued in Monthly numbers of not less than 48 pages.

SINGLE NUMBERS, 30 CENTS.

Address all communications for publication, etc., to the Editor.

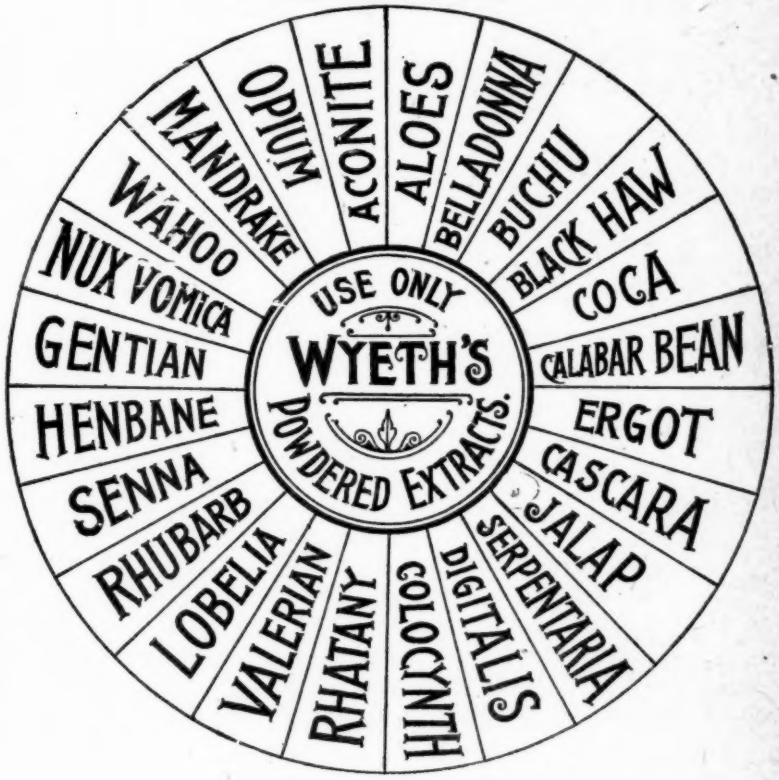
All communications relating to subscriptions, advertisements, etc., to the Business Manager, P. LAPLE, 145 North Tenth Street, Philadelphia, Pa.

Richard Stern & Co., Print., Pa., 115-117 North Seventh St., Phila'a.

THE LATEST ADDITION TO THE PRESCRIPTION COUNTER.

WYETH'S STANDARD POWDERED EXTRACTS.

When Ordering POWDERED EXTRACTS always SPECIFY WYETH'S.



INCLUDE ONE OUNCE IN YOUR FIRST ORDER TO YOUR JOBBER.

The reputation that all our preparations possess for **Accuracy, Purity and Medicinal Activity,** applies equally to our

NEW LINE OF POWDERED EXTRACTS.

Our long experience enables us to manufacture **EXTRACTS of UNIMPAIRED VIRTUE.**

Scrupulous Care used in the Selection of the Finest Drugs.

A PRELIMINARY ASSAY ACCURATELY MADE OF THE VALUE OF THE DRUG.

Perfect and Modern Appliances for EVAPORATING in VACUO, and DRYING SCIENTIFICALLY at a REGULATED TEMPERATURE

It is with pleasure that we announce to the Dispensing Chemist, that we are prepared to supply a line of PURE and RELIABLE POWDERED EXTRACTS. We respectfully ask our friends to give these Extracts a trial, being convinced that this will be the best means of demonstrating their superiority. Special quotations for large quantities.

JOHN WYETH & BROTHER,
Manufacturing Chemists, PHILADELPHIA.